

Final Technical Report

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Executive Summary

The Industrial Assessment Center at Iowa State University provided 93 companies in 5 states with Industrial Assessments. The total potential energy cost savings is approximately \$11.43 million. The savings includes approximately 38.6 million kWh of electrical energy, 65 MW of electrical demand, and 426,000 MMBtu of natural gas. The center employed and trained 43 engineering students and involved 4 engineering faculty from both the Industrial and Mechanical Engineering Departments. Benefits to the public include increased productivity of manufacturing plants, training of engineering students in the area of industrial energy efficiency and reduced energy consumption.

Task Summary

Task 1: Conduct Industrial Assessments, to include a variety of plant types and sizes and well as coverage of the geographic area defined in the Annual Workplan Industrial Assessments:

The IAC at Iowa State University served 93 clients in 5 states during the contract period. The geographical coverage includes Iowa, Minnesota, South Dakota, Nebraska and Missouri. Figure 1 illustrates the approximate locations of the plants assessed.

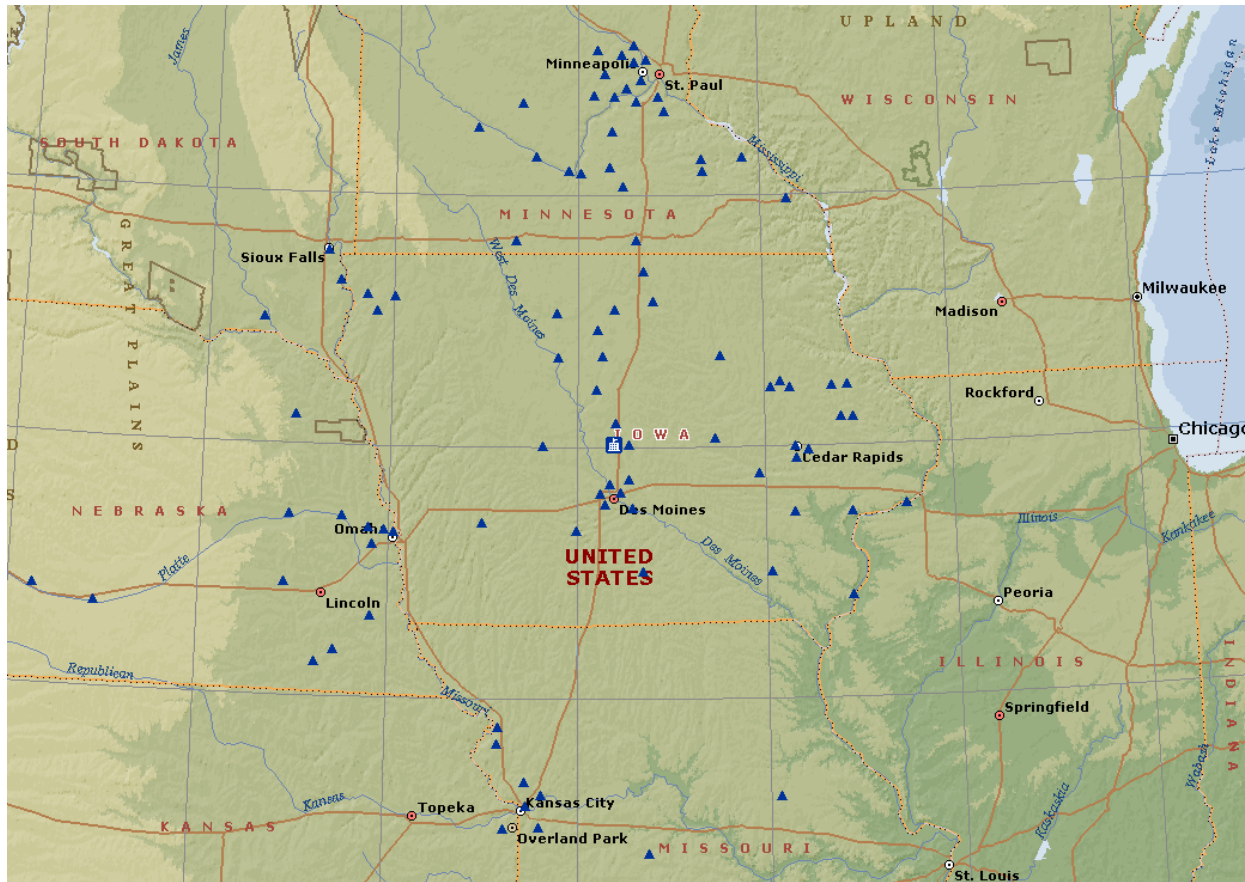


Figure 1. Plant locations served by the Iowa State University IAC

Industries served include SIC codes from 20 to 39. Figure 2 illustrates the number of assessments by SIC code. Of the companies assessed, the food and kindred products industry (SIC 20xx) represented the largest group. This emphasis correlates to the importance of food production to the region's economy. The second largest group is the metal fabrication industry (SIC 35xx).

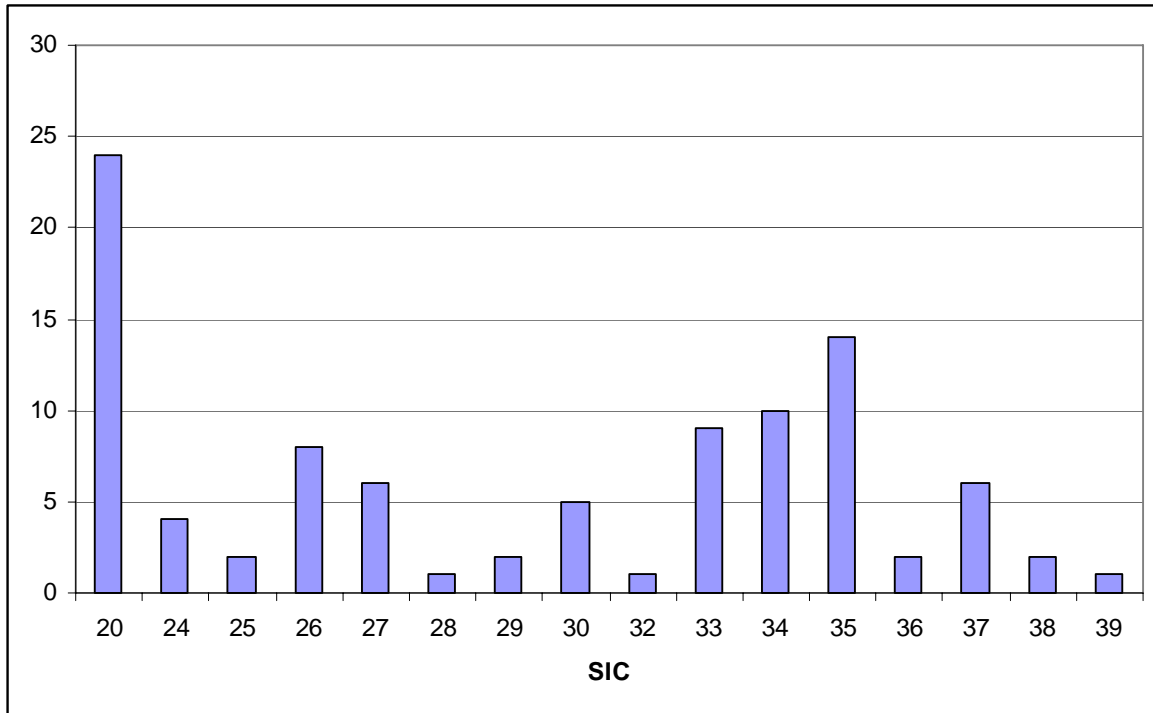


Figure 2. IAC Assessments by SIC code

Table 1 provides a summary of the potential energy and dollar savings from the assessments performed. The table shows the energy savings in electrical energy, electrical demand and gas usage for each program year as well as the total for the contract period. Energy cost savings are also shown by program year with a total savings of \$11.4 million per year.

Table 1. Potential Energy Savings

Energy Savings per Year					
	2003	2004	2005	2006	Total
Energy (kWh)	9,384,133	6,221,013	8,218,953	14,761,178	38,585,277
Demand (kW)	16,999	12,378	12,497	23,111	64,986
Gas (MMBtu)	43,899	158,948	20,404	202,803	426,054
Dollar Savings	\$1,254,134	\$2,550,641	\$4,936,124	\$2,693,583	\$11,434,482

Table 2 provides a summary of the number of assessments made per year and the total number of recommendations according to the type of recommendation: energy, waste and productivity.

Table 2. Summary of AR's

Recommendation Summary per Year					
	2003	2004	2005	2006	Total
Number of Assessments	24	26	21	22	93
Energy ARs	182	209	142	208	741
Waste ARs	6	1	9	4	20
Productivity ARs	13	21	28	3	65

Task 2: Promote and increase the adoption of assessment recommendations and employ innovative methods to assist in accomplishing these goals.

The ISU IAC routinely contacted the local utility company for each client to inquire about rebate programs and incentives that could be used to lower the implementation cost and thus encourage the client to implement assessment recommendations

Another strategy we adopted included talking more with the clients at the end of the audit day about implementing recommendations and the benefits of the recommendations. In some cases we were able to show the client preliminary dollar savings from the analysis performed while at the plant, which increased buy-in from plant personnel.

Task 3: Promote the IAC Program and enhance recruitment efforts for new clients and expanded geographic coverage.

The IAC program was promoted in several ways. These include direct mailing/phone call follow up, presentations to industrial groups, promotion through ISU extension, and working with state agencies in Iowa and neighboring states.

Utilizing manufacturers' directories for Iowa and neighboring states, mailings were sent to companies that appeared to be prospective clients for the program. Follow up phone calls were made to answer questions and explore company interest in the program.

Numerous presentations were made to utility groups, at economic development meetings, and manufacturer trade groups to promote the program. The center also worked with the Iowa Department of Natural Resources, Iowa State University Extension-CIRAS (Center for Industrial Research and Service), The Iowa MEP, the Iowa Waste Reduction Center, The Nebraska MEP, The Minnesota MEP, and the Minnesota Waste Reduction program. The center also had a series of articles about the IAC program published in newsletters for Iowa State Extension. The newsletter is distributed to manufacturers across Iowa.

As shown in Figure 1, the ISU IAC was successful in reaching out to a broad geographic region in five states.

Task 4: Provide educational opportunities, training, and other related activities for IAC students.

The IAC at ISU provide several educational and training events for the 43 students who worked for the center throughout the course of the award. Training sessions were presented by graduate students, faculty and representatives from industry. IAC students also participated in national organizations such as the ACEEE, and ASHRAE.

Some specific training courses included:

- Pipe Insulation
- Compressed air systems
- Boiler/Steam systems
- Industrial/commercial lighting
- Power measurements
- Air leak detection
- Thermal imaging
- Utility bills analysis
- Industrial safety
- Manufacturing productivity

Several students attended ASHRAE meetings at both the national and local level. The meeting included:

- Under-floor ventilation
- Refrigeration
- Contaminants and contaminant removal
- Tours of various commercial and industrial buildings
- Career opportunities in HVAC

Furthermore, students attended Best Practice training on

- Steam
- Pumping Systems

Task 5: Coordinate and integrate Center activities with other Center and IAC Program activities, DOE's Industrial Technologies programs and other EERE programs.

The IAC at ISU targeted attention to the SEN program and the assistance of companies that did not qualify for SEN assessments. Dr. Greg Maxwell has prepared, and presented, a training session on compressed air systems practices for the participants of the Cedar Rapids, IA site of the NWFPA teleconference.

We have increased the usage of software offered by DOE. We direct clients that contact our center and don't qualify for the IAC program to other programs from DOE's Industrial Technologies.

Task 6: Other tasks or special projects, as needed, and as determined by DOE to be advantageous to the program and in furtherance of IAC Program goals.

The IAC performed several tasks related to the furtherance of the IAC Program goals. These include:

- The IAC contacted 117 companies as part of the Large Energy Group contact list as requested by DOE.
- The center also promoted the Save Energy Know campaign through our own emails lists and a presentation made to the Iowa Industrial Energy Group annual meeting in Johnston, Iowa.
- Three one-day workshops (102 participants representing 58 different companies) on motors and drives with a brief presentation on the SEN program.

- Alex Rodrigues (an IAC graduate student) worked with CIRAS on a State funded IOF project for the Food Industry.
- Trevor Gilbertson (an IAC undergraduate student) worked with the CIRAS on a State funded IOF project for the Chemical Industry.
- Dr. Maxwell and Dr. Nelson have received certification for Air Master and Steam specialist, respectively.
- Our IAC participated in the DoE/OIT Metalcasting Energy Profile Project by performing an assessment of a magnesium die-casting plant.